

REMARKS

Claims 13-27 are pending.

Claims 17-19, 22 and 27 stand rejected under 35 USC §112, first paragraph.

Claims 13-27 stand rejected under 35 USC §112, second paragraph.

Claims 13-14, 16, 17-8, 20-26 stand rejected under 35 USC §103(a) as being unpatentable over the patent issued to Inoue (4,792,197) in view of Kashyap (6,307,679).

Claims 15 and 19 stand rejected under 35 USC §103(a) as being unpatentable over the patent issued to Inoue (4,792,197) in view of Kashyap (6,307,679).

Claim 27 stands rejected under 35 USC §103(a) as being unpatentable over the patent issued to Inoue (4,792,197) in view of Kashyap (6,307,679) and further in view of Cook (5,629,998).

Attached hereto is a marked-up version of the changes made to the abstract, specification, and claims by the current amendment. The attached version is captioned **“VERSION WITH MARKINGS TO SHOW CHANGES MADE.”**

Changes to claims:

Claims 13-27 have been amended. No new matter has been added.

Rejection under 35 USC §112, first paragraph – claims 17-19, 22, and 27

Claims 17-19, 22 and 27 stand rejected under 35 USC §112, first paragraph. This rejection is respectfully traversed.

Claim 17 has been amended to further particularly point out and distinctly claim subject matter that the Applicant regards as the invention.

With respect to dependent claims 18-19, and 27 that depend from claim 17, the arguments set forth above are equally applicable here. The base claims being allowable, the dependent claim must also be allowable.

Claim 22 has been amended to claim a process for forming a Fabry-Perot cavity. The amendments to claim 22 are supported by the paragraph starting at page 31, line 25 in the present specification.

Therefore, Applicant respectfully requests that the 35 USC 112, first paragraph rejection be withdrawn.

Rejection under 35 USC §112, second paragraph – claims 13-27

Claims 13-27 stand rejected under 35 USC §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which application regards as the invention. This rejection is respectfully traversed.

The Office Action alleges that claim 13 is indefinite because of the phrase “generates a corresponding phase shift in the Bragg grating.” Claim 13 has been amended to replace “generates” with “records”.

The Office Action alleges that claims 14 and 15 are functional and fails to provide appropriate means for carrying the functions. Claims 14 and 15 have been amended accordingly.

The Office Action alleges that claim 16 appears to be vague and indefinite. Claim 16 has been amended accordingly to further particularly point out the invention.

The Office Action alleges that claim 17 appears to be vague and indefinite. Claim 17 has been amended accordingly to further particularly point out the invention.

The Office Action alleges that claims 21 and 23 appear narrative, functional and confusing. Claims 21 and 23 have been amended accordingly to further particularly point out the invention.

The Office Action alleges that claim 25 is indefinite because the term "said light guide" lacks antecedent basis. Claim 25 has been amended accordingly.

The Office Action alleges that claim 26 is indefinite because the term "Bragg grading". Claim 26 has been amended to replace "grading" with "grating."

In view of the foregoing, it is respectfully asserted that claims 13-27 are now in condition for allowance. The applicant respectfully requests the rejection to the claims under §112, second paragraph be withdrawn.

Rejection under 35 USC §103(a) – claims 13-14, 16, 17-18, 20-26

Claims 13-14, 16, 17-18, 20-26 stand rejected under 35 USC §103(a) as being unpatentable over the patent issued to Inoue (4,792,197) in view of Kashyap (6,307,679). This rejection is respectfully traversed.

Under MPEP §706.02(j), in order to establish a prima facie case of obviousness required for a §103 rejection, three basic criteria must be met: (1) there must be some suggestion or motivation either in the references or knowledge generally available to modify the reference or combine reference teachings (MPEP §2143.01), (2) a reasonable expectation of success (MPEP §2143.02), and (3) the prior art must teach or suggest all the claim limitations (MPEP §2143.03). See In re Royka, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974).

Claim 13:

The Office Action alleges that Inoue suggests that the phase plate may be placed at different positions and thus suggests that the plate may be displayed in translational sense. See Office Action page 5. The Office Action also alleges that Inoue teaches that the phase plate may be put at different angular positions.

On the other hand, claim 13 claims “a phase plate having an adjustable position and orientation during said writing”. The amendment to claim 13 is supported by the specification at page 28, lines 3-13, page 34, lines 1-9, page 39, lines 14-20, and page 40, lines 23-30. Neither Inoue nor Kashyap teach or suggest a phase plate having an adjustable position and orientation during the process. Inoue teaches “**disposing a material at a position 21, 22, or 23**” suggesting statically positioning before the process. See col. 2, line 45. In contrast, the presently claimed invention claims dynamic positioning during the process. Kashyap teaches an apparatus for forming a grating in an optical fiber. However, Kashyap does not teach or suggest a phase plate having an adjustable position and orientation during the process.

The Office Action alleges that Inoue teaches “that the Bragg grating is formed on the substrate based on photochemical reaction of the substrate material with the inference pattern.” See Office Action page 6.

On the other hand, claim 13 claims “generating an interference pattern ... in the substrate.” Inoue does not teach or suggest generating an interference pattern in the substrate but “**on the surface** of a material.” See col. 2, lines 5-6.

Thus, Applicant submits that claim 13 recites novel subject matter which distinguishes over any possible modification of Inoue and Kashyap.

Claims 14, 16, 17-18, 20-26:

The proposed combination of Kashyap and Inoue does not possess all of the claim limitations of claims 14, 16, 17-18, 20-26. The arguments set forth above are equally applicable here.

The presently claimed invention is, accordingly, distinguishable over the cited reference. In view of the foregoing, it is respectfully asserted that 13-14, 16, 17-18, 20-26 are now in condition for allowance.

Rejection under 35 USC §103(a) – claims 15 and 19

Claims 15 and 19 stand rejected under 35 USC §103(a) as being unpatentable over the patent issued to Inoue (4,792,197) in view of Kashyap (6,307,679). This rejection is respectfully traversed. The arguments set forth above are equally applicable here.

Rejection under 35 USC §103(a) – claim 27

Claim 27 stands rejected under 35 USC §103(a) as being unpatentable over the patent issued to Inoue (4,792,197) in view of Kashyap (6,307,679) and further in view of Cook (5,629,998). This rejection is respectfully traversed. The arguments set forth above are equally applicable here.

Conclusion

For all of the above reasons, applicant submits that the amended claims are now in proper form, and that the amended claims all define patentability over the reference. Therefore, Applicant submits that this application is now in condition for allowance.

Request for allowance

It is believed that this Amendment places the above-identified patent application into condition for allowance. Early favorable consideration of this Amendment is earnestly solicited. If, in the opinion of the Examiner, an interview would expedite the prosecution of this application, the Examiner is invited to call the undersigned attorney at the number indicated below.

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

Claims 13-27 have been amended as follows:

13. (Twice Amended) A process for writing a Bragg grating in a transparent substrate, the Bragg grating forming a spectral filter with regard to a light wave that passes through it, the process comprising:

generating an interference pattern between two light beams with the same wavelength and coherent with each other but with angular offset in the substrate; and writing said interference pattern to the substrate, in the form of a modulation of the refraction index of the transparent substrate, with a phase plate having an adjustable position and orientation during said writing,

wherein said phase plate divides at least one of said light beams into at least two sub-beams, creates a phase shift between said at least two sub-beams, and [generates] ~~records~~ a corresponding phase shift in the Bragg grating.

14. (Twice Amended) The process according to claim 13, wherein [said writing further comprises using an amplitude separation configuration] a separating plate divides a main light beam into said two light beams.

15. (Twice Amended) The process according to claim 13, wherein [said writing further comprises using a wave front separation configuration] a prism divides a main light beam into said two light beams.

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16. (Twice Amended) The process according to claim 13, wherein the position [of said phase shift or the value of said phase shift or the position and value of said phase shift in the light beam formed by said at least two sub-beams,] and orientation of said phase plate is modified with time.

17. (Twice Amended) An apparatus for writing a Bragg grating in a substrate, said apparatus comprising:

means for generating an interference pattern between two light beams with the same wavelength and coherent with each other but with angular offset at the substrate;
at least one phase plate [capable of creating] dividing at least one of said light beams into at least two sub-beams to create a phase shift between said at least two sub-beams, said phase plate writing said interference pattern in the substrate in the form of modulation of the refraction index of the substrate; and

means for adjusting during said writing the position of said phase plate, said means for adjusting having at least two degrees of freedom, one being angular degree of freedom provided for adjustment of the value of the phase shift, and the other being a translation degree of freedom provided for adjustment of the position of the phase shift in the light beam formed by the two sub-beams.

18. (Twice Amended) An apparatus according to claim 17 further comprising interferometric means with two or three mirrors for [transferring] writing the interference

pattern according to an amplitude separation configuration, said interferometric means coupled to said means for adjusting.

19. (Twice Amended) An apparatus according to claim 17 further comprising interferometric means with a prism for [transferring] writing the interference pattern according to a wave front separation configuration, said interferometric means coupled to said means for adjusting.

20. (Once Amended) The process according to claim 13, wherein the phase shift between said at least two sub-beams is substantially equal to π .

21. (Twice Amended) [The] A process [according to claim 13,] for erasing a previously written Bragg grating in a substrate [further] comprising:

[writing said interference pattern in the substrate with a phase plate, wherein the substrate includes a pre-written identical Bragg grating, at the same position, with a phase change of over the entire length of the prewritten grating, to erase all or some of the pre-written grating in order to obtain a given reflection coefficient]

positioning a phase plate to create an interference pattern with a relative phase difference of π over the previously written Bragg grating; and

writing said interference pattern in the substrate with said phase plate to erase the previously written Bragg grating,

wherein the previously written Bragg grating was created by:

generating said interference pattern between two light beams with the same wavelength and coherent with each other but with angular offset in the substrate; and

writing said interference pattern to the substrate, in the form of a modulation of the refraction index of the transparent substrate, with said phase plate having an adjustable position and orientation during said writing,

said phase plate divides at least one of said light beams into at least two sub-beams, creates a phase shift between said at least two sub-beams, and records a corresponding phase shift in the Bragg grating.

22. (Twice Amended) [The] A process [according to claim 13 further] for forming a Fabry-Perot cavity comprising:

[forming a Fabry-Perot cavity delimited by] writing two successive Bragg gratings at [different positions in space] a spacing equal to the length of the cavity,

wherein each Bragg grating is written by:

generating an interference pattern between two light beams with the same wavelength and coherent with each other but with angular offset; and

writing said interference pattern to a substrate, in the form of a modulation of the refraction index of said substrate, with a phase plate having an adjustable position and orientation during said writing,

said phase plate divides at least one of said light beams into at least two sub-beams, creates a phase shift between said at least two sub-beams, and generates a corresponding phase shift in the Bragg grating.

23. (Twice Amended) [The] A process [according to claim 13 further] for writing a Faber-Bragg grating comprising:

[forming a Bragg grating with a determined index modulation envelope by successively writing two Bragg gratings comprising parts in phase opposition, the time taken to overwrite one Bragg grating by the other being variable, the position of the phase shift being variable and the value of the phase shift being variable]

positioning a phase plate to create an interference pattern with a phase difference of π over the previously written Bragg grating;

writing said interference pattern in the substrate with said phase plate to erase the previously written Bragg grating;

writing a new interference pattern in the substrate over the previously written Bragg grating;

wherein the previously written Bragg grating was created by:

generating said interference pattern between two light beams with the same wavelength and coherent with each other but with angular offset in the substrate;
and

writing said interference pattern to the substrate, in the form of a modulation of the refraction index of the transparent substrate, with said phase plate having an adjustable position and orientation during said writing,

said phase plate divides at least one of said light beams into at least two sub-beams, creates a phase shift between said at least two sub-beams, and records a corresponding phase shift in the Bragg grating

24. (Twice Amended) The process according to claim 23, wherein the position of the phase [shift] plate is being displaced by a programmable movement.

25. (Once Amended) The process according to claim 13, wherein [said light guide] the substrate is an optical fiber.

26. (Once Amended) The process according to claim 23, wherein the Bragg [grading] grating is an apodized Bragg [grading] grating.

27. (Once Amended) An apparatus according to claim 17 further comprising interferometric means with a Lloyd folded mirror for [transferring] writing the interference pattern according to a wave front separation configuration, said interferometric means coupled to said means for adjusting.